Fuel Trafficking in the Great Bear

Eric M Keen

Abstract
One crude oil and four liquefied natural gas (LNG) pipeline-tanker projects have been proposed for the Kitimat Marine Terminal in the Great Bear Rainforest. The tankers for these projects would transit the Gitga’at marine territory (also the study area of CetaceaLab and the Bangarang Project) as early as 2018. The oil proposal, Enbridge’s Northern Gateway Pipeline (220 supertankers per annum), has passed its environmental assessment and is awaiting final approval from Canada’s National Energy Board (NEB). Two of the four LNG proposals (totaling 310-490 tankers per annum) have been approved by the NEB and are expected to begin construction in late 2014. By this author’s calculations, these proposals would increase current deep-sea shipping rates in the study area by more than 500%.

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Bangarang Backgrounders are imperfect but rigorous reviews – written in haste, not peer-reviewed – in an effort to organize and memorize the key information for every aspect of the project. They will be updated regularly as new learnin’ is incorporated.
Fuel Trafficking in the Great Bear

Introduction

The Bangarang Project is a baseline study of the pre-tanker ecology of inland whales, seabirds and their prey in the Great Bear Rainforest, British Columbia. Ten years ago, the Great Bear was a quiet place that very few knew about. The Gitga’at community of Hartley Bay was unfamiliar to most British Columbians, and it was rarely visited by tourists or scientists. Only the Gitga’at and a handful of researchers knew of the place’s importance to humpback whales and the black bears with white fur, or Kermode bears\(^2\).

Today, due to a series of fossil fuel trafficking proposals that have sparked international debate, the Great Bear Rainforest has gained global notoriety. Maritime development is coming to the Great Bear, though the details of its form and extent remain uncertain.

This Backgrounder summarizes these proposals, outlines their process of approval, details their current status, examines them within the Great Bear’s social and environmental context, and connects them to the ecosystem being studied in the Bangarang Project.

The proposals relevant to the Bangarang study area can be divided into two sections: 1) The Enbridge Northern Gateway oil pipeline-tanker project, and 2) a suite of Liquified Natural Gas (LNG) pipeline-tanker projects.

Northern Gateway Pipeline (NGP)

Proposal

The Enbridge Northern Gateway Pipeline (NGP) is a $7.9 billion project\(^3\) that would take diluted bitumen from Alberta’s oil sands to the B.C coast via 1,177km of twin pipelines, then across the Pacific to Asian markets using tankers.

The 3 ft-diameter westbound pipeline, used for bitumen transport, will deliver 525,000 barrels of diluted bitumen oil per day. The 20”-diameter eastbound pipeline for condensate will deliver 193,000 barrels of condensate per day\(^4\). These would be the first oil and condensate pipelines to cross northern B.C.\(^5\) The pipe would be laid in a 25m right of way that will be cleared and leveled for the project\(^6\). The pipelines would also be capable of carrying synthetic crude oil (upgraded bitumen) and conventional light, medium, and heavy crude oils.\(^7\) Aircraft would routinely fly the length of the pipeline to monitor for spills and safety violations.\(^8\)

At the Kitimat Marine Terminal near the top of Douglas Channel, chartered\(^9\) supertankers will carry the crude bitumen through the waterways of the Great Bear Fjordland (known in this proposal as the Confined Channel Assessment Area, CCAA) and overseas to Asian refineries\(^10\). The condensate used to dilute the bitumen at its Albertan extraction site will be delivered from the Asia-Pacific to Kitimat using smaller

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\(^2\) http://ngm.nationalgeographic.com/2011/08/kermode-bear/barcott-text
\(^4\) http://www.gatewayfacts.ca/about-the-project/project-overview/
\(^10\) http://www.gatewayfacts.ca/about-the-project/project-overview/
tankers, then transported along the eastbound pipeline. The total number of tankers calling at Kitimat per year to deliver condensate or load oil products would be 190-250, with an expected average of 220 (or 440 transits of the CCAA annually; 1.2 transits per day).

Three types of tankers would be chartered for this project: Aframax (80,000 dead-weight tons, 220.8m design minimum length, 32m wide), Suezmax (160,000 dwt, 274m average length, 47m wide), and Very Large Crude Carriers (VLCC, 320,000 dwt, 343.7m design maximum, 70m wide). 70% of the 220 annual calls would be for the delivery of condensate by 50 Aframax and 20 Suezmax tankers. The remaining 150 would be for crude oil transport by 50 VLCC and 100 more Suezmax tankers. Suezmax tankers would therefore perform half of all calls to the Kitimat marine terminal for this project. The VLCCs, though they are less maneuverable, would require fewer transits of the CCAA than smaller alternatives.

These tankers will all be double-hulled, with separate tanks for ballast water so that hydrocarbons never come into contact with seawater. The tankers chartered for this project would first have to pass a tanker vetting program implemented by Northern Gateway. As they traverse the CCAA at a reduced speed of 8-12 knots, they must be escorted by custom-designed tugs. One escort tug is required for an unladen tanker, while for laden tankers a second tug must follow behind. Local pilots would board the tankers at boarding stations before entering the CCAA.

**Marine Route**

Tankers entering and leaving the Confined Channel Assessment area have three route options from which to choose:
- **Northern approach:** vessels inbound from and outbound to Asia. Passes Haida Gwaii through Dixon Entrance, and continues through Hecate Strait, Browning Entrance, Principe Channel, Nepean Sound, Otter Channel, Squally Channel, Lewis Channel, Wright Sound and Douglas Channel.
- **Southern direct approach:** limited to moderate weather use, particular in winter. Passes through Queen Charlotte Sound, continues through Hecate Strait, Caamano Sound, Campania Sound, Squally Channel, Lewis Passage, Wright Sound and Douglas Channel.
- **Southern approach via Principe Channel:** through Hecate Strait, Browning Entrance, Principe Channel, Nepean Sound, Otter Channel, Squally Channel, Lewis Passage, Wright Sound and Douglas Channel.

Enbridge opted for the Lewis Channel route instead of Whale Channel because Lewis was marginally less complex to navigate. Grenville Channel and Loredo Channel were also considered as alternative routes.

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11. http://www.gatewayfacts.ca/about-the-project/project-overview/  
Tankers using the northern route would require 15 hours to transit the Confined Channel Assessment Area; southern approach (Caamano) tankers need 10 hours; southern approach (Principe Channel) tankers would need 12 hours. Loading and unloading the tankers at Kitimat terminal would take approximately 48 hours. The safe passing of inbound and outbound tankers would involve careful timing. 33% of the tankers would take the Northern Approach, 13% would take the southern (Principe) approach, and the remaining 54% would take the Caamano Sound Southern Approach.

From Enbridge (2010) Section 52 Application. Volume 8A:

The two narrowest points on these routes are near Dixon Island in Principe and near Emilia Island in Douglas Channel (four times the length of a VLCC). However, in Enbridge’s words, “navigation through Lewis Passage and Wright Sound is expected to be the most challenging because of higher deflecting angle turns through a geographic S-curve. The minimum width within these areas is 4,570m. Both fast-time and FMBS simulations of VLCCs could safely navigate the S-curve in winds up to 50 knots combined with a 2 knot current. Wright Sound is also an area where marine traffic bound for the Kitimat Terminal – and other terminals in the area – and marine traffic navigating the Inner Passage converge and simulation work has shown that there is adequate manoeuvring room for this type of traffic interaction.”

34 Enbridge Northern Gateway Pipeline. 2010. Sec. 52 Application, Volume 8B: Environmental and Socio-Economic Assessment (ESA) – Marine Transportation. May 2010.
Rationale
In the mid-2000’s, Canada’s federal government launched a $591-million Asia-Pacific Gateway and Corridor Initiative to position itself as a competitive trading partner with Asian markets. In this vein, many economists began pushing for the diversification of Canada’s fossil fuel clientele. In the height of this Asian trade push, Enbridge launched the Northern Gateway Project. According to the project’s website, the pipeline would provide Asian markets with Albertan bitumen and thus diversify Canada’s oil exports. The US currently buys 99% of Canadian oil, and Canada is the US’s single largest foreign supplier. As US oil consumption levels off and support for the tar sands wanes, Canada is eager for reaching out to other markets. With Asia, Canada would find better prices and sell more for years to come.

Bitumen supply from the tar sands oil is expected to more than double in the next 20 years, from 2.8 million barrels per day to 6.2 million barrels per day. Already, the oil sands are extracting more oil than can be shipped and refined, forcing low market prices. Building the pipeline would open up new markets, create demand, drive up prices, and facilitate the expansion of Albertan oil sands operations by 30%.

Enbridge promises that for the next 30 years, the NGP will generate $300 billion in Canadian Gross Domestic Product, $2.6 billion in nationwide tax revenue ($1.2 billion of which in BC), 3000 short-term construction jobs, and 1150 long-term jobs (560 of which in BC). Northern Gateway offered 10% equity to First Nations along the pipeline’s route. According to Enbridge, 15 of 18 offers to Alberta First Nations were accepted and 11 of 22 were accepted by BC First Nations.

Among others alleged benefits, Enbridge has also claimed that the navigational aids and emergency response mechanisms needed for their tankers would benefit all mariners in the area.

Company History
The project has been proposed by the Calgary-based Enbridge Corporation, originally incorporated as Interprovincial PipeLine (IPL) in 1949 following the first major oil discovery in Alberta. Their first pipeline shuttled bitumen to refineries in the east. IPL’s name changed to Enbridge in 1998. Their current pipeline system in North America is the longest in the world (24,738 km) and they employ roughly 10,000 people. Enbridge is currently expanding its natural gas extraction and transportation endeavors, and owns Enbridge Gas Distribution, the largest and fastest growing Canadian natural gas distribution utility.

Like all pipeline companies, Enbridge’s incident record is not clean. Between 1999 and 2010, 804 Enbridge spills released 161,475 barrels of crude oil into the environment. The NGP environmental assessment reports that in the last decade, Enbridge has had 635 small spills at surface facilities, 83 spills of less than 100 barrels along pipeline right-of-ways, and 21 spills of more than 100 barrels along...
right-of-way pipeline.\textsuperscript{57} Of particular note is the Kalamazoo River oil spill in July 2010, in which over 1 million US gallons\textsuperscript{58} of bitumen flowed from a rupture in Enbridge’s Line 6B pipeline into a tributary of the Kalamazoo River\textsuperscript{59}. The most recent incident occurred in late June 2013 in northern Alberta, where 750 gallons were lost\textsuperscript{60}.

\textbf{Alberta’s Diluted Bitumen}

The Athabaskan oil sands of northeastern Alberta, the largest of several deposits in that region, constitute the largest reservoir of bitumen in the world\textsuperscript{61}. “Oil sand”, or “tar sand”, is a sandy earth saturated with an extremely viscous hydrocarbon known as bitumen. Because bitumen oil cannot be used without added extraction measures and intensive “upgrading”, the refined version (known as unconventional petroleum) is land-, water-, and emission-intensive. 715 km\textsuperscript{2} of boreal forest had been disturbed by oil sand mining operations as of 2013\textsuperscript{62}, daily water usage in the oil sands is double that of Calgary\textsuperscript{63} (though some extraction methods, such as Steam-Assisted Gravity Drainage, are able to recycle nearly 95% of the water it uses\textsuperscript{64}), and well-to-wheel emissions are 12%\textsuperscript{65} to 20%\textsuperscript{66} greater than conventional liquid hydrocarbon deposits. Compared to lighter crude oils, diluted bitumen takes longer to degrade naturally. However, as the global supply of conventional oil diminishes, the use of oil sands bitumen has grown increasingly profitable.

The condensate involved in this proposal also comes with environmental risks. Spilled condensate would disperse and degrade more readily, but would be toxic in its evaporated form.\textsuperscript{57}

\textbf{Tankers}

The world’s largest merchant ships are extremely efficient carriers of crude oil (2-3 cents per US gallon; an economy of scale second only to pipelines)\textsuperscript{68}. VLCC are the largest supertankers in regular use today, but Ultra Large Crude Carriers (ULCC), popular in the late 20\textsuperscript{th} century, were the largest ever built. The largest of them was the \textit{Seawise Giant} (1979, 458.45m long); it is no longer in operation\textsuperscript{69}.

When tankers are not laden with the product they are carrying, they need to be ballasted with seawater. Tankers in a ballasted condition are more strongly affected by crossweinds (due to the combined effects of less draft and more windage above water), while laden tankers are more strongly affected by currents.\textsuperscript{70} The NGP VLCCs would transit the CCAA in both modes: ballasted while inbound and laden while outbound.\textsuperscript{71}

\textbf{Provincial Politics}

When the NGP proposal was first announced, it was strongly opposed by leaders of the BC National Democratic Party (NDP).\textsuperscript{72} While BC premier Christy Clark (BC Liberal Party) had been supportive of natural gas pipelines within her province (see LNG section), she was not convinced of the Northern

\textsuperscript{60} http://business.financialpost.com/2013/06/24/enbridges-major-alberta-oil-lines-shut-after-weekend-spill/?_lsa=cf2e-2e4a
\textsuperscript{61} Mather, Clive “The Oil Sands of Alberta”, Canada Broadcasting Corporation.
\textsuperscript{62} “Reclamation”, Government of Alberta Environment ministr
\textsuperscript{65} Barbara Lewis, David Ljunggren and Jeffrey Jones (10 May 2012). “Canada’s Tar Sands Battle With Europe”. Huffington post. Reuters.
\textsuperscript{68} UNCTAD 2006, p. 4.
\textsuperscript{69} Det Norske Veritas, 2008. Dimensions.
\textsuperscript{70} Enbridge Northern Gateway Project. 2010. Sec. 52 Application, Volume 8A: Overview and General Information – Marine Transportation. May 2010.
\textsuperscript{72} Murray Rankin, "B.C. pipeline review needed to restore legal powers", Times Colonist, August 31, 2012
Gateway bitumen pipeline. Enbridge’s Kalamazoo River bitumen spill in 2010 inspired her to announce five conditions Enbridge would have to meet for BC ever to condone the pipelines:\(^5\):
1) Approval by the Joint Review Panel (see below)
2) World-leading marine oil spill response, prevention, and recovery systems
3) World-leading land oil spill prevention, response, and recovery systems
4) First Nations are given ample opportunity to benefit from the pipeline and legal concerns over their aboriginal rights are addressed.
5) BC receives a fair share of the economic benefits of the pipeline, especially given the disproportionate risk they face from the pipeline.

Reiterating these five conditions, Clark officially opposed the NGP in her final submission to the Northern Gateway Joint Review Panel in May 2013\(^6\). There were speculations that this strong stance was spurred by Alberta premier Alison Redford’s reluctance to enter negotiations on profit sharing between provinces\(^7\). But in November 2013, Clark assured Alberta that it would seek benefits from proponents of the project and not through royalties or taxes. The two premiers then announced their joint support for the project, including a commitment to work together to meet BC’s five conditions.\(^8\)

Public Opposition
As of a May 2011, 80% of British Columbians would support banning crude oil tankers in BC’s coastal waters, and only 8.1% strongly supported the NGP.\(^9\) As of November 2013, Clark assured Alberta that it would seek benefits from proponents of the project and not through royalties or taxes. The two premiers then announced their joint support for the project, including a commitment to work together to meet BC’s five conditions.\(^10\)

The concerns raised by these groups include, but are not limited to:

**Oil Sands**
- The expansion of the tar sands extraction sites facilitated by the pipeline would lead to further deforestation, groundwater contamination, habitat fragmentation, and carbon emissions.\(^11\)
- While this pipeline may encourage fossil fuel industries to diversify, it would hurt non-oil based sectors and ultimately pose an inflationary threat to the national economy.\(^12\)

**Overland Portion**
- Canadian safety regulations, written for conventional oil transport, are inadequate for responsibly transporting bitumen.\(^13\)
- Bitumen may corrode pipelines at high rates, increasing the likelihood of overland spills.\(^14\)
- Exporting bitumen to foreign refineries amounts to exporting jobs from Canada.\(^15\)
- The pipeline crosses the land of 65 First Nation groups. Only one of these groups has endorsed the NGP. Signatories of the Save the Fraser Declaration are lodging a legal challenge to the project over Aboriginal Title.\(^16\) This challenge has not yet been settled.\(^17\)

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73 http://www.vancouversun.com/business/Premier+Christy+Clark+courts+conservatives/6278629/story.html
74 http://www.huffingtonpost.ca/2013/05/31/northerngateway/www.aadnc
77 http://www.theglobesandmail.com/business/Premier+Christy+Clark+courts+conservatives/6278629/story.html

- The overland pipelines would cross at least 880 rivers and streams (as many as 1000), including crossings in the Fraser, Mackenzie and Skeena River watersheds, many of which support salmon and other fish stocks.
- Many portions of the overland route are prone to landslides.93

**Marine Portion**
- The NGP would bring crude oil tankers to the Great Bear Rainforest (pledged to be protected by BC and federal governments94) for the first time in history.95
- The tanker’s route through the Great Bear’s waterways is treacherous, the risk of incident is high, and Enbridge has not demonstrated the competence to avoid “the inevitable”96.
- The waterways of the Great Bear rainforest are subject to heavy seasonal storms and strong year-long currents. These conditions increase the likelihood of a spill97.
- The noise and risk of ship strikes will render the Great Bear Rainforest’s waterways unsuitable for the resident populations of fin, humpback, and killer whales.98
- The unprecedented wake from VLCC traffic would damage tidal harvest grounds for coastal First Nations.99
- If a spill should occur, coastal First Nations will suffer prolonged consequences and will be “left with the cleanup.”100
- Technological improvements to navigation systems can never remove the risk of human error in shipping101.

**Review Process**
- The most detailed and concrete plans would not develop until after the hearing process was over and the project was already approved.102

**First Nations Opposition**
In March 2010, before Enbridge had officially applied for government approval, nine Coastal First Nations declared a ban on tanker traffic, promising to do whatever it takes to stop the pipeline.103

The Yinka Dene Alliance (YDA) is a coalition of six northern BC First Nations who are against the NGP passing through their territories. They cite land rights, and concerns for their livelihood and the environment. The YDA has appealed to international stakeholders, including Chinese President Hu Jintao104105, the Chines populace106, and the UN Committee on the Elimination of Racial Discrimination107. The YDA was also a primary negotiator of the Save the Fraser Declaration.

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92 http://www.energycbc.ca/issues/northerngateway.html
93 The issue: Enbridge’s proposed Northern Gateway pipeline and tanker project threatens North America”. Forest Ethics;
94 http://forestethics.org/energybc/the-facts=
95 http://www.livingoceans.org/sites/default/files/media/uploads/pipeline-tanker-
96 trouble.pdf?utm_medium=email&utm_campaign=Pipeline+and+tanker+trouble+news+release++29112011&utm_content=Pipeline+and+tanker+trou
97 ble+news+release++29112011+CID_e12ee5dd5714c321361cb44d89e42199&utm_source=Email+marketing+software&utm_term=Download+the+r
98 eport
100 http://forestethics.org/energybc/the-facts
101 http://www.livingoceans.org/sites/default/files/media/uploads/pipeline-tanker-
102 trouble.pdf?utm_medium=email&utm_campaign=Pipeline+and+tanker+trouble+news+release++29112011&utm_content=Pipeline+and+tanker+trou
103 ble+news+release++29112011+CID_e12ee5dd5714c321361cb44d89e42199&utm_source=Email+marketing+software&utm_term=Download+the+r
104 eport
105 http://www.energybc.ca/issues/northerngateway.html
106 www.forwhales.org
107 http://www.livingoceans.org/sites/default/files/media/uploads/pipeline-tanker-
108 trouble.pdf?utm_medium=email&utm_campaign=Pipeline+and+tanker+trouble+news+release++29112011&utm_content=Pipeline+and+tanker+trou
109 ble+news+release++29112011+CID_e12ee5dd5714c321361cb44d89e42199&utm_source=Email+marketing+software&utm_term=Download+the+r
110 eport
The Save the Fraser Declaration is a document of indigenous law that bans the NGP and similar tar sands projects from crossing the territories of the signatories or the watersheds and marine waters used by Fraser River salmon. Originally signed by 60 First Nation groups, that number has now grown to more than 130.

**Government Review**

Due to the potential environmental impacts and the degree of public concern over the NGP, the Minister of the Environment convened a Joint Review Panel (JRP) in December 2009. This panel of three (a vice-chair of the National Energy Board (NEB); an energy lawyer and NEB member; and a First Nations mineralogist) was charged with gathering evidence and testimony from all stakeholders in a public process. Using these data, the JRP was to assess the environmental impacts of the project and decide whether the project is in the public interest despite the expected or probable impacts. Their central question: “Would Canada and Canadians be better off or worse off if the project were approved?”

After the NEB received a formal application for the NGP from Enbridge in May 2010, the JRP solicited input from the public on the issues to be considered by the panel and the locations of public hearings. The JRP announced the “List of Issues” and proposed oral hearing venues in January 2011. These issues included: the need for the project; potential effects of the project; environmental effects; socio-economic effects; consultation; financial and tolling matters; routing, design, construction and operation; safety, accident prevention, and emergency response; follow-up and monitoring; recommendations and conditions.

The JRP first had to decide the extent of its mandate. Increases in oil sands operations and emissions in Canada or in the Asian markets (from the upgrading and use of the sold oil) were considered beyond the scope of their assessment. They also left the question of Aboriginal land claims to the federal government. It was also made clear that in future and separate applications, Northern Gateway would be free to apply to expand the annual capacity of the pipeline.

The public could participate in the hearing process in a variety of official capacities: filing a letter of comment, making an oral statement, or registering as an intervener. 9,000 letters of comment were sent to the JRP. 206 intervenors and 12 government participants participated in the hearings. There were 77 days of community hearings held in 21 communities, followed by 96 days of final hearings in larger BC cities. These hearings ended in 2013.

**Joint Review Panel Decision**

On December 19, 2013, the JRP issued its two-volume, 600+ page final report in which they conditionally approved the NGP. Although aspects of the proposal were considered detrimental to the Canadian environment, the JRP found that NGP generally met or exceeded all critical regulations for the overland and marine route. Their decision:

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108 “Save The Fraser Declaration”. Yinka Dene Alliance.
110 http://gatewaypanel.review-examen.gc.ca/cf-rs/bts/jnrwprvpt-eng.html
111 http://gatewaypanel.review-examen.gc.ca/cf-rs/hm-eng.html
113 http://gatewaypanel.review-examen.gc.ca/cf-rs/lwsrly2013/lwsrls05bckgrndr-eng.html
“After weighing the evidence, we concluded that Canada and Canadians would be better off with the Enbridge Northern Gateway Project than without. We recommend approval…subject to the 209 conditions set out in Volume 2 of our report.”

The 209 conditions of approval in the JRP’s final report, if accepted by the federal government, will be legally binding for Enbridge. The final decision officially rests with the Governor-in-Council (GIC, the cabinet of Canadian Prime Minister Stephen Harper). The GIC may request that the NEB replace or remove any of the JRP’s conditions.

Current Status & Next Steps
The Governor-in-Council has six months from December 10, 2013, to issue its final decision on the NGP proposal. After the GIC decision, the NEB has 7 days to provide Enbridge with its permit.

Many opponents of the NGP do not consider the fight to be over. The 130 signatory First Nations of the Save the Fraser Declaration have vowed to continue their active opposition to the project. Many groups, including the Gitga’at First Nation, have threatened direct action if the government approves the project.
LNG

Introduction
In contrast to the Northern Gateway Pipeline, a single proposal which has dominated headlines and political debates for the last several years, liquefied natural gas (LNG) represents a very different development. A dozen or more LNG tanker projects have been proposed for the coast. Most have been enthusiastically supported by both provincial and federal governments of Canada. All have been disproportionately under-featured in news outlets.

Liquified Natural Gas
When natural hydrocarbon gas is cooled to -160 degrees Celsius, it condenses it into a liquid form that is 600x less voluminous. Liquified Natural Gas (LNG), therefore, is a fossil fuel that can be transported highly efficiently.

Natural gas was first industrially extracted before oil, in 1825, and its use began to skyrocket in the mid-20th century. Natural gas extraction and transport represents one of Canada’s fastest growing business sectors, with Enbridge Gas Distribution as its most prominent leader. However, to date, only 8% of the economically recoverable reserves have been used, meaning the remaining reserves would last 250 more years at current rates of use.

Compared to other fuels, LNG is considered safe and environmental. It is non-corrosive, non-toxic, non-explosive, and evaporates and disperses quickly when exposed to air (therefore eliminating the disastrous risk of spills). The major issues surrounding natural gas, other than that it is a finite resource that still produces harmful emissions, are in regard to its extraction. Gaseous fossil fuels are drawn to wells using the controversial method of hydraulic fracturing (“fracking”), which requires and contaminates large volumes of water that after use are difficult to contain and treat. Fracking is also energy intensive; some claim that fracking renders the well-to-wheel carbon footprint of natural gas greater than that of conventional petroleum products. Fracking sites are notorious for groundwater contamination and public health hazards.

The “LNG Boom”
In India and Asia, where cleaner fossil fuel technologies are outpacing natural gas reserves, prices for natural gas are four times higher than in North America. In 2007, China became a net importer of natural gas. After the 2011 Fukushima disaster shut down Japan’s nuclear energy infrastructure, the country turned to LNG.

The province of British Columbia has significant reserves of natural gas, the majority of which is found from the Cadomin formation, a sedimentary conglomerate of sand, shale, and coal in BC’s Deep Basin and the Peace River basin. To date, this natural gas has been transported within the continent via pipelines; there are no LNG terminals anywhere on the BC coast.

Recognizing its position to supply burgeoning Asian markets with cheap natural gas, the provincial government of British Columbia has launched an aggressive LNG proliferation campaign in the last decade. The BC LNG push has been adamantly supported by the BC Premier Christy Clark. One

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129 http://www.enbridge.com/AboutEnbridge/CorporateOverview.aspx
135 http://www.fortisbc.com/About/AboutNaturalGas/Pages/Natural-gas-in-BC.aspx
136 http://engage.gov.bc.ca/Enginbc/b/c-c-s lng-story/
137 http://engage.gov.bc.ca/Enginbc/
proposals, the Douglas Channel Energy Partnership (DCEP), is even spear-headed by the Haisla First Nation.

Proposals
At least twelve\textsuperscript{142} multibillion-dollar LNG tanker proposals are now in various stages of review at the National Energy Board\textsuperscript{143}. Analysts expected only three to four are thought to receive approval, which only added to the "race"\textsuperscript{144}. But the NEB has approved seven so far\textsuperscript{145}. The flurry has disoriented and overwhelmed oppositional groups, activists, and even the coastal ports that have been enlisted as marine terminals in the proposals\textsuperscript{146}. As a result, reliable information has been difficult to obtain.

Some of these proposals have not triggered the environmental assessment process. The reason is that, in July 2012, the Canadian Environmental Assessment Act of 2012 (CEAA 2012) recently superceded the former CEEA.\textsuperscript{147} The former CEAA did operate under a "trigger" approach, in which an assessment was automatically required whenever a federal authority intended to participate in the project. The new CEAA 2012, however, uses a "project list" approach: an assessment is only required and automatic for a selection of designated project types. For most of the project types, an assessment will only be undertaken where the federal government exercises its discretion to do so. The new regulations in this act were allegedly written with specious consultation from the public. The review process under CEAA 2012 is also of a more limited scope than the previous act.\textsuperscript{148} With the implementation of these looser review requirements, more than 2,950 assessments have been stopped in their tracks.\textsuperscript{149}

Of the twelve current proposals, nine are for BC's north coast. These would each pipe natural gas to one of three marine terminals\textsuperscript{150}: Grassy Point (northernmost), Prince Rupert, and Kitimat. There are four Kitimat proposals, two of which have been approved by the National Energy Board. These Kitimat proposals would send carriers through the study area; they are summarized below\textsuperscript{151}.

**BC LNG (Douglas Channel Energy Partnership, DECP)**
Applicant: Douglas Channel Gas Services, Haisla Nation, Golar LNG, LNG Partners
Pipeline supplier: Pacific Northern Gas Transmission Pipeline
National Energy Board (NEB) Decision: None yet.
Assessment: Does not trigger the BC Environmental Assessment (EA) process.
Annual capacity: 1.8 million tonnes LNG
Tankers/year: 30
Final investment decision: 2014
In service date: 2016
Website: www.douglaschannelenergy.com

**Kitimat LNG**
Applicant: Apache Canada and Chevron Canada
Pipeline supplier: Pacific Trail Pipeline
NEB Decision: Approved October 2011.
Assessment: EA in progress.\textsuperscript{152}
Annual capacity: 10 million tonnes

\textsuperscript{142} http://www.cbc.ca/news/canada/british-columbia/b-c-s-natural-gas-reserves-double-previous-estimates-1.2417050
\textsuperscript{143} http://engage.gov.bc.ca/lnginbc/
\textsuperscript{144} http://www.theglobeandmail.com/report-on-business/breakthrough/the-race-to-ship-liquefied-natural-gas-to-asia/article13260357/
\textsuperscript{149} http://business.financialpost.com/2013/06/28/kitimat-lng-chevron-apache/2
\textsuperscript{150} http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/british-columbias-potential-lng-terminals/article8556483/?f=1
\textsuperscript{151} http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/british-columbias-potential-lng-terminals/article8556483/?from=1
\textsuperscript{152} KLNG. YEAR. Executive Summary, Kitimat LNG terminal project: comprehensive study report.
Tankers/year: 140
Final investment decision: 2014
In service date: 2017-2018.
Website: www.kitimatlngfacility.com

LNG Canada
Applicant: Shell Canada, PetroChina Company, Korea AS Corp, Mistsubishi Corp
Pipeline supplier: TransCanada Coastal GasLink Pipeline
NEB Decision: Approved 4 Feb. 2013
Assessment: NA
Annual capacity: 24 million tonnes
Tanker/year: 170-350
Final investment decision: 2015
In service date: 2017/2018
Website: www.lngcanada.ca

Triton LNG
Applicant: AtlaGas Ltd. And Idemitsu Canada Corp
Pipeline supplier: Pacific Northern Gas Transmission Pipeline
NEB Decision: None yet.
Assessment: Pre-application submitted.
Annual capacity: 2.3 million tonnes
Tanker/year: 38 (estimated)
Final investment decision: In service date: 2017.
Website: www.altagas.ca or www.idemitsu.com

The Tankers
LNG carriers are designed with four to size thickly insulated tanks for transoceanic movement of LNG. Recent LNG carriers range in size from ~270m lengths typical in the 1990s to the recent Qatar-Max (Q-Max) ships (345m x 54m x 12m deep).

The minimum number of LNG tankers expected to call at Kitimat annually is 310. This is if no more proposals are approved for the Kitimat Marine Terminal and if the LNG-Canada project requires only its minimum estimate of tankers. If LNG-Canada uses its maximum estimate, 520 LNG carriers till transit the study area twice per year. If all proposals are approved, this number would increase to 588 tankers.

Next Steps
Global energy investors continue vying for position in BC’s LNG race. In February the BC government will release an updated tax policy on the LNG sector, after which the companies behind the seven approved proposals will render their final investment decisions.
Context

Current Traffic Rates

An informal tanker moratorium for Queen Charlotte Sound, Dixon Entrance, and Hecate Strait has been in place since 1972. The federal House of Commons passed a non-binding motion in December 2010 to ban bulk oil tanker traffic from these areas.

This is not to say that Douglas Channel goes unused. Ships associated with marine trade have been calling at Kitimat since the 1950’s. Douglas Channel has been used by carriers of industrial products for 35+ years. These include petroleum products, such as methanol and condensate. However, to date, no crude oil tankers have entered the Great Bear.

The port of Kitimat currently serves markets in Japan, Hong Kong, Korea, Southeast Asia, Taiwan, Europe, Middle East, Africa, South America and United States. Most of Kitimat’s commercial traffic is associated with two existing deep-sea terminals that are still in operation: (1) Rio Tinto Alcan, aluminum imports from Australia and Brazil, pitch from Korea, and green coke from the USA; 50-60 vessels/year. (2) Methanex: Importer of methane, ammonia and condensate; in 2008, 13 tanker/yr carried methanol and 11 tankers/yr carried condensate. Transit rates for commercial traffic in Douglas Channel is fairly regular year-round.

Current vessel traffic numbers have been focused on Douglas Channel and Wright Sound. Wright Sound is a convergence of multiple shipping lanes; it is the most intensively transited body of water in the CCAA. This author has not seen any mention of current traffic rates in the remainder of the Confined Channel Assessment Area. Caamaño and Estevan Sounds are an “outside” route of the Inside Passage that probably experiences the traffic levels still less than those in Douglas Channel. For these and the other less used waterways of the CCAA (Lewis, Squally, Otter and Campania), it would be conservative to suggest that Douglas Channel traffic rates provide an overestimate of traffic rates. Because of this, this discussion of current traffic rates will focus on Douglas Channel and not Wright Sound.

Note that numbers reflect only the traffic of reporting vessels; “non-reporting” vessels (pleasure-craft under 30m or all vessels under 20m) go uncounted, and probably constitute 50% of the existing summertime traffic in the CCAA. Also note that not all reporting vessels are alike; consider the difference between a 30m sailboat and a 296m cruise ship -- or the largest ship ever to call to Kitimat and the VLCCs to be used by NGP (320,000 dwt). Yet traffic increases in the NGP assessment have been measured only in terms of number of transits. Size, wake, cargo, and noise of the transiting vessel are not accounted for in vessel traffic metrics.

Douglas Channel

Actual traffic rates are difficult to ascertain. Because vessel traffic has increased over the decades, the number of ships calling to Kitimat depends on the time frame one averages together. According to

165 "B.C. oil tanker ban motion passes in Commons". CBC News. 2010-12-07. Retrieved 2010-12-08.
167 Methanex: Importer of methane, ammonia and condensate; in 2008, 13 tanker/yr carried methanol and 11 tankers/yr carried condensate.
168 Transit rates for commercial traffic in Douglas Channel is fairly regular year-round.
169 Current vessel traffic numbers have been focused on Douglas Channel and Wright Sound. Wright Sound is a convergence of multiple shipping lanes; it is the most intensively transited body of water in the CCAA. This author has not seen any mention of current traffic rates in the remainder of the Confined Channel Assessment Area. Caamaño and Estevan Sounds are an “outside” route of the Inside Passage that probably experiences the traffic levels still less than those in Douglas Channel. For these and the other less used waterways of the CCAA (Lewis, Squally, Otter and Campania), it would be conservative to suggest that Douglas Channel traffic rates provide an overestimate of traffic rates. Because of this, this discussion of current traffic rates will focus on Douglas Channel and not Wright Sound.
170 Note that numbers reflect only the traffic of reporting vessels; “non-reporting” vessels (pleasure-craft under 30m or all vessels under 20m) go uncounted, and probably constitute 50% of the existing summertime traffic in the CCAA. Also note that not all reporting vessels are alike; consider the difference between a 30m sailboat and a 296m cruise ship -- or the largest ship ever to call to Kitimat (50,000 dead-weight-tons, dwt) and the VLCCs to be used by NGP (320,000 dwt). Yet traffic increases in the NGP assessment have been measured only in terms of number of transits. Size, wake, cargo, and noise of the transiting vessel are not accounted for in vessel traffic metrics.
171 Douglas Channel

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Enbridge, the number of ships “servicing industry” in Kitimat has averaged 226 per year from 1982 to 2009. Of these, the number of ships “dedicated to the transport of petroleum products” (which refers to methane and condensate) has averaged 47 per year from 1978 to 2009, or 58 per year since 1982 to 2009.

According to Enbridge’s application to the National Energy Board for the Northern Gateway Project, current tanker traffic in Douglas Channel can be attributed primarily to Rio Tinto (59-72 ships per year) and Methanex (11-17 ships per year). Eurocan was shut down in 2010; it contributed 42-89 ships per year to Douglas Channel. Including Eurocan, current traffic rates are 112-178 tanker calls to Kitimat per year; not including Eurocan (representing the case after 2010), rates are 70-89 calls to Kitimat per year.

In either case, the contributions of Rio Tinto and Methanex do not encompass all commercial traffic in Douglas Channel. In the years 2000 to 2008, for all commercial traffic (fishing vessels and tug boats with log tows included), there were an average of 276 calls to Kitimat per year.

However, if we limit the count to deep-sea ship calls only, which is what all Enbridge and LNG tanker traffic will be, there were 96 calls to Kitimat per year (averaged 2000-2008). This represents the highest number of deep-sea ships that Enbridge itself has provided, and we will use it for traffic increase estimates in the following section.

**Expected Traffic Increases**

**Enbridge**

The smallest kind of tanker chartered for the NGP, Aframax tankers, would be heavier than the heaviest tanker ever to call to Kitimat to date. An NGP Very Large Crude Carrier would be more than six times heavier. It would carry 3x as much oil as the petroleum tankers currently calling on BC’s coast down in Burnaby Bay.

Enbridge says that “the project-related tankers will increase the existing Douglas Channel marine traffic by about 220 vessels per year [190 – 250 range], or an increase of 86% compared to current traffic to Kitimat.” In its final report, the Joint Review Panel says that Enbridge says that tankers would lead to a 10-35% increase in ship traffic within the Confined Channel Assessment Area. Elsewhere, the JRP states that NGP tankers would represent 33% of traffic in Douglas Channel specifically.

It is unclear how NGP and JRP derived these numbers. Annually, depending on the baseline, NGP tankers would increase traffic in Douglas Channel by as low as 76% (if the baseline is the 276 “commercial” vessels per year), or 97% (if the baseline is the 226 ships “servicing industry” in Kitimat), or 230% (if the baseline is the 96 deep-sea ships calls to Kitimat per year), to as high as 379% (if the baseline is the 1982-2009 average of 58 petroleum product carriers per year).

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178 [Joint Review Panel. 2013. Northern Gateway Project Review Volume 1: Connections. We assume the end date 2009 because 2010 was the date Enbridge’s application was formally submitted.](http://www.northerngateway.ca/news-and-media/northern-gateway-blogs/marine-safety/tanker-traffic-in-kitimat-today/)


This author’s conclusion: Using Enbridge’s own reported numbers, the NGP tankers would represent a 97% increase in industrial traffic in Douglas Channel and a 230% increase in deep-sea ship calls to Kitimat.

**LNG**

The two currently approved LNG proposals will introduce 310-490 LNG carriers to Douglas Channel, depending on the production of the LNG Canada pipeline. If all four Kitimat proposals are approved, this total would increase to 378 – 558 LNG carriers per year.

With the two approved projects alone (without NGP), LNG tankers would represent a 322% - 510% increase in annual deep-sea tanker traffic in Douglas Channel (if the baseline is 96 per year\(^\text{190}\)).

**Total**

Other shipping proposals are on the horizon as well. Arthon Construction Ltd and Sandhill Materials plans to export sand and gravel and gravel from Kitimat, requiring 36\(^\text{191}\)–96\(^\text{192}\) bulk carriers (60,000 to 75,000 dwt each). Rio Tinto Alcan Smelting plans to expand its capacity, increasing by 25-30 vessels / yr.\(^\text{193}\)

With these non-fossil fuel projects counted alongside NGP and LNG proposals, Douglas Channel will be facing 561 – 934 more deep-sea tankers per year within the next 5 years. If the baseline is 96 deep-sea tankers per year currently\(^\text{194}\), this represents a 584% - 972% increase in Douglas Channel traffic rates.

**Nearby Shipping Incidents**

**March 22, 2006**

BC Ferry Queen of the North runs aground on north tip of Gil Island. The people of Hartley Bay (Gitga’at) rescued all but two passengers and turned their town center into a rescue/first aid center for the survivors\(^\text{195}\). The fourth officer, who allegedly was either having sex or fighting with a former lover when the crash took place, was found guilty of criminal negligence causing the deaths of 2 passengers.\(^\text{196}\)

**November 21, 2012**

German containership Hanjin-Geneva runs aground on a sandbar outside of Prince Rupert (82 miles north of the study area) to avoid collision with a small fishing vessel. The ship was piloted by a certified BC coastal pilot. No one was injured. The ship was successfully refloated.\(^\text{197}\)

**November 23, 2012**

Two days after the Hanjin-Geneva accident, 188-m deep-sea cargo ship Tern Arrow lost engine power in heavy seas and high winds in Laredo Sound, on the southern border of the study area. It was adrift for three hours before emergency power was established and the ship was navigated into open waters\(^\text{198}\).
Conclusion

Like the pipelines in the proposals outline here, things are converging in the Great Bear. One of the most remote and silent places on earth has become the stage for the most volatile political and capital developments in recent Canadian history. It is difficult to isolate any one drop in the oncoming wave of changes facing the Great Bear Fjordland, but for its whales the tanker traffic is the single greatest concern.

Enbridge’s Northern Gateway Pipeline (190-250 tankers per year) has successfully passed their environmental assessment and now awaits final approval by the National Energy Board (expected June 2014). Two Kitimat-based LNG proposals have been approved by the NEB: LNG Canada (170-350 tankers per year), and Kitimat LNG (140 tankers per year). All three of these projects would be operational by late 2018. Other industrial projects would add 61-126 deep-sea bulk carrier calls to Kitimat per year.

After that, Kitimat will be visited by 561-934 tankers per year. This amounts to 1,122-1,868 transits of the Great Bear Fjordlands per year; between two and four per day. Referring back to Enbridge’s numbers for current deep-sea ship traffic (96 per year), these projects would increase the number of ships using Great Bear waters by 584 - 972%.